## PNM SJGS BART Analysis - Cost Analysis (Draft)

 Technology:
 SNCR/SCR Hybrid - SJGS Unit 1
 Date: 7/11/2007

Cost Item	\$	Remarks/Cost Basis				
CAPITAL COST  Direct Costs  Purchased equipment costs  Hybrid system scope:  Reagent delivery system  Wall injectors and multiple nozzle lances  Automatic injector and lance retract system  Flue gas temperature, NOx monitors  Reagent storage tank	\$15,753,000	B&V cost development from vendor quote				
Single layer catalyst SCR system Ductwork modifications						
Electrical system upgrades Instrumentation and control system	\$378,000 \$279,000	Actual price from similarly sized unit, escalated to 2007 dollars  Actual price from similarly sized unit, escalated to 2007 dollars				
Subtotal capital cost (CC)	\$16,410,000					
Gross Receipt Tax Freight	\$1,015,000 \$821,000	(CC) X 6.2% (CC) X 5.0%				
Total purchased equipment cost (PEC)	\$18,246,000	(66) // 6.6%				
Direct installation costs						
Foundation & supports	\$3,649,000	(PEC) X 20.0%				
Handling & erection	\$5,474,000 \$2,727,000	(PEC) X 30.0%				
Electrical Piping	\$2,737,000 \$456,000	(PEC) X 15.0% (PEC) X 2.5%				
Insulation	\$1,825,000	(PEC) X 10.0%				
Painting	\$182,000	(PEC) X 1.0%				
Demolition	\$1,825,000	(PEC) X 10.0%				
Relocation	\$912,000	(PEC) X 5.0%				
Total direct installation costs (DIC)	\$17,060,000					
Air preheater modifications	\$1,071,000	Scaled from a B&V project based unit size, using 0.7 scale factor				
Balanced draft conversion	\$13,366,000	Adjusted from a B&V balanced draft conversion project based on differences in scope				
Site preparation Buildings	\$1,000,000 \$200,000	Contingency for site unknowns, such as underground utilities				
Total direct costs (DC) = (PEC) + (DIC)	\$50,943,000	Contingency for general site building requirements				
Indirect Costs						
Engineering	\$3,566,000	(DC) X 7.0%				
Owner's cost	\$2,547,000	(DC) X 5.0%				
Construction management	\$5,094,000	(DC) X 10.0%				
Construction indirect	\$11,222,000	B&V labor market review				
Start-up and spare parts	\$1,528,000	(DC) X 3.0%				
Performance test Contingencies	\$509,000 \$10,189,000	(DC) X 1.0% (DC) X 20.0%				
Total indirect costs (IC)	\$34,655,000	(50) // 20.5%				
Interest During Construction (IDC) Loss Generation during Outage (GEN)	\$3,171,000 \$15,667,000	[(DC)+(IC)] X 7.41% 1 years (project time length X 1/2) 5 weeks and 0.06095 \$/kWh 12 weeks required for BDC, 7 weeks major outage available				
Total Capital Investment (TCI) = (DC) + (IC) + (GEN)	\$104,436,000					
ANNUAL COST Direct Annual Costs Fixed annual costs						
Operating labor	\$125,000	1 FTE and 124,862 \$/year Estimated manpower level				
Maintenance labor & materials	\$1,528,000	(DC) X 3.0%				
Total fixed annual costs	\$1,653,000					
Variable annual costs						
Urea	\$1,703,000	1,089 lb/hr and 420 \$/ton Engineering estimate				
Water	\$1,762,000	252 gpm and 15.67 \$/1,000 gal Engineering estimate				
Catalyst replacement Auxiliary power	\$215,000 \$32,000	33 m3 and 6,500 \$/m3 2 yr catalyst replacement rate 70 kW and 0.06095 \$/kWh Engineering estimate				
ID fan power	\$670,000	1,477 kW and 0.06095 \$/kWh Engineering estimate				
Total variable annual costs	\$4,382,000					
Total direct annual costs (DAC)	\$6,035,000					
Indirect Annual Costs						
Cost for capital recovery	\$10,172,000	(TCI) X 9.74% CRF at 7.41% interest & 20 year life				
Total indirect annual costs (IDAC)	\$10,172,000					
Total Annual Cost (TAC) = (DAC) + (IDAC)	\$16,207,000					

## PNM SJGS BART Analysis - Cost Analysis (Draft)

 Technology:
 SNCR/SCR Hybrid - SJGS Unit 2
 Date:
 7/11/2007

Cost Item	\$	Remarks/Cost Basis				
CAPITAL COST Direct Costs						
Purchased equipment costs Hybrid system scope: Reagent delivery system Wall injectors and multiple nozzle lances Automatic injector and lance retract system	\$15,753,000	B&V cost development from vendor quote				
Flue gas temperature, NOx monitors Reagent storage tank Single layer catalyst SCR system Ductwork modifications						
Electrical system upgrades Instrumentation and control system Subtotal capital cost (CC)	\$372,000 \$278,000 \$16,403,000	Actual price from similarly sized unit, escalated to 2007 dollars Actual price from similarly sized unit, escalated to 2007 dollars				
Gross Receipt Tax	\$1,015,000	(CC) X 6.2%				
Freight Total purchased equipment cost (PEC)	\$820,000 \$18,238,000	(CC) X 5.0%				
Direct installation costs						
Foundation & supports	\$3,648,000 \$7,305,000	(PEC) X 20.0% (PEC) X 40.0%				
Handling & erection Electrical	\$7,295,000 \$2,736,000	(PEC) X 40.0% (PEC) X 15.0%				
Piping	\$456,000	(PEC) X 2.5%				
Insulation	\$1,824,000	(PEC) X 10.0%				
Painting	\$182,000	(PEC) X 1.0%				
Demolition Relocation	\$1,824,000 \$912,000	(PEC) X 10.0% (PEC) X 5.0%				
Total direct installation costs (DIC)	\$18,877,000	(120)				
Air preheater modifications	\$1,071,000	Scaled from a B&V project based unit size, using 0.7 scale factor				
Balanced draft conversion	\$13,366,000	Adjusted from a B&V balanced draft conversion project based on differences in scope				
Site preparation Buildings	\$1,000,000 \$200,000	Contingency for site unknowns, such as underground utilities Contingency for general site building requirements				
Total direct costs (DC) = (PEC) + (DIC)	\$52,752,000					
Indirect Costs						
Engineering	\$3,693,000	(DC) X 7.0%				
Owner's cost	\$2,638,000	(DC) X 5.0% (DC) X 10.0%				
Construction management Construction indirect	\$5,275,000 \$13,041,000	B&V labor market review				
Start-up and spare parts	\$1,583,000	(DC) X 3.0%				
Performance test	\$528,000	(DC) X 1.0%				
Contingencies  Total indirect costs (IC)	\$10,550,000 \$37,308,000	(DC) X 20.0%				
Total indirect costs (IC)	φ37,300,000					
Interest During Construction (IDC) Loss Generation during Outage (GEN)	\$3,337,000 \$15,231,000	[(DC)+(IC)] X 7.41% 1 years (project time length X 1/2) 5 weeks and 0.06095 \$/kWh 12 weeks required for BDC, 7 weeks major outage available				
Total Capital Investment (TCI) = (DC) + (IC) + (GEN)	\$108,628,000					
ANNUAL COST Direct Annual Costs						
Fixed annual costs	\$125,000	1 FTE and 124,862 \$/year Estimated manpower level				
Operating labor Maintenance labor & materials	\$1,583,000	1 FTE and 124,862 \$/year Estimated manpower level (DC) X 3.0%				
Total fixed annual costs	\$1,708,000	(35)				
Variable annual costs						
Urea Water	\$1,703,000 \$1,762,000	1,089 lb/hr and 420 \$/ton Engineering estimate 252 gpm and 15.67 \$/1,000 gal Engineering estimate				
Catalyst replacement	\$1,762,000	252 gpm and 15.67 \$/1,000 gal Engineering estimate 33 m3 and 6,500 \$/m3 2 yr catalyst replacement rate				
Auxiliary power	\$32,000	70 kW and 0.06095 \$/kWh Engineering estimate				
ID fan power	\$670,000	1,477 kW and 0.06095 \$/kWh Engineering estimate				
Total variable annual costs	\$4,382,000					
Total direct annual costs (DAC)	\$6,090,000					
Indirect Annual Costs  Cost for capital recovery	\$10,580,000	(TCI) X 9.74% CRF at 7.41% interest & 20 year life				
Total indirect annual costs (IDAC)	\$10,580,000	(10)/A 5.14% ONE at 1.41% interest & 20 year me				
Total Annual Cost (TAC) = (DAC) + (IDAC)	\$16,670,000					

 Technology:
 SNCR/SCR Hybrid - SJGS Unit 3
 Date: 7/11/2007

Cost Item	\$	Remarks/Cost Basis				
CAPITAL COST Direct Costs						
Purchased equipment costs  Hybrid system scope:  Reagent delivery system  Wall injectors and multiple nozzle lances	\$23,680,000	B&V cost development from vendor quote				
Automatic injector and lance retract system Flue gas temperature, NOx monitors Reagent storage tank Single layer catalyst SCR system						
Ductwork modifications Electrical system upgrades	\$484,000	Actual price from similarly sized unit assalated to 2007 dollars				
Instrumentation and control system	\$291,000	Actual price from similarly sized unit, escalated to 2007 dollars  Actual price from similarly sized unit, escalated to 2007 dollars				
Subtotal capital cost (CC)	\$24,455,000	•				
Gross Receipt Tax	\$1,513,000	(CC) X 6.2%				
Freight Total purchased equipment cost (PEC)	\$1,223,000 \$27,191,000	(CC) X 5.0%				
Direct installation costs						
Foundation & supports	\$5,438,000	(PEC) X 20.0%				
Handling & erection	\$10,876,000	(PEC) X 40.0%				
Electrical Piping	\$4,079,000 \$680,000	(PEC) X 15.0% (PEC) X 2.5%				
Insulation	\$2,719,000	(PEC) X 10.0%				
Painting	\$272,000	(PEC) X 1.0%				
Demolition	\$2,719,000	(PEC) X 10.0%				
Relocation  Total direct installation costs (DIC)	\$1,360,000 \$28,143,000	(PEC) X 5.0%				
Air preheater modifications	\$8,685,000	Based on a budgetary quote received for the project				
Balanced draft conversion	\$17,122,000	Adjusted from a B&V balanced draft conversion project based on differences in scope				
Site preparation	\$1,000,000	Contingency for site unknowns, such as underground utilities				
Buildings Total direct costs (DC) = (PEC) + (DIC)	\$200,000 \$82,341,000	Contingency for general site building requirements				
Indirect Costs						
Engineering	\$5,764,000	(DC) X 7.0%				
Owner's cost	\$4,117,000	(DC) X 5.0%				
Construction management	\$8,234,000	(DC) X 10.0%				
Construction indirect Start-up and spare parts	\$19,442,000 \$2,470,000	B&V labor market review (DC) X 3.0%				
Performance test	\$823,000	(DC) X 1.0%				
Contingencies	\$16,468,000	(DC) X 20.0%				
Total indirect costs (IC)	\$57,318,000					
Interest During Construction (IDC) Loss Generation during Outage (GEN)	\$5,174,000 \$23,674,000	[(DC)+(IC)] X 7.41% 1 years (project time length X 1/2) 5 weeks and 0.06095 \$/kWh 12 weeks required for BDC, 7 weeks major outage available				
Total Capital Investment (TCI) = (DC) + (IC) + (GEN)	\$168,507,000					
ANNUAL COST Direct Annual Costs						
Fixed annual costs	*					
Operating labor Maintenance labor & materials	\$125,000 \$2,470,000	1 FTE and 124,862 \$/year Estimated manpower level (DC) X 3.0%				
Total fixed annual costs	\$2,595,000	(DC) X 3.070				
Variable annual costs						
Urea	\$2,641,000	1,689 lb/hr and 420 \$/ton Engineering estimate				
Water Catalyst replacement	\$2,658,000 \$270,000	380 gpm and 15.67 \$/1,000 gat Engineering estimate 42 m3 and 6,500 \$/m3 2 yr catalyst replacement rate				
Auxiliary power	\$32,000	70 kW and 0.06095 \$/kWh Engineering estimate				
ID fan power	\$997,000	2,197 kW and 0.06095 \$/kWh Engineering estimate				
Total variable annual costs	\$6,598,000					
Total direct annual costs (DAC)	\$9,193,000					
Indirect Annual Costs						
Cost for capital recovery  Total indirect annual costs (IDAC)	\$16,413,000 \$16,413,000	(TCI) X 9.74% CRF at 7.41% interest & 20 year life				
Total Annual Cost (TAC) = (DAC) + (IDAC)	\$25,606,000					

## PNM SJGS BART Analysis - Cost Analysis (Draft)

 Technology:
 SNCR/SCR Hybrid - SJGS Unit 4
 Date: 7/11/2007

Cost Item	\$	Remarks/Cost Basis				
CAPITAL COST  Direct Costs  Purchased equipment costs  Hybrid system scope:  Reagent delivery system  Wall injectors and multiple nozzle lances  Automatic injector and lance retract system  Flue gas temperature, NOx monitors  Reagent storage tank  Single layer catalyst SCR system	\$23,680,000	B&V cost development from vendor quote				
Ductwork modifications	0.40.4.000					
Electrical system upgrades Instrumentation and control system	\$484,000 \$291,000	Similar scope to SCR modifications Similar scope to SCR modifications				
Subtotal capital cost (CC)	\$24,455,000	Similar scope to	SCK IIIodili	cations		
Gross Receipt Tax	\$1,513,000	(CC) X 6	6.2%			
Freight	\$1,223,000	(CC) X 5	5.0%			
Total purchased equipment cost (PEC)	\$27,191,000					
Direct installation costs						
Foundation & supports	\$5,438,000	(PEC) X 2	20.0%			
Handling & erection	\$8,157,000		30.0%			
Electrical	\$4,079,000	(PEC) X 1	15.0%			
Piping	\$680,000	(PEC) X 2	2.5%			
Insulation	\$2,719,000	, ,	10.0%			
Painting	\$272,000	, ,	1.0%		,	
Demolition	\$2,719,000		10.0%			
Relocation  Total direct installation costs (DIC)	\$1,360,000 \$25,424,000	(PEC) X 5	5.0%			
rotal direct installation costs (210)	Ψ20,424,000					
Air preheater modifications	\$8,685,000	Based on a budg	getary quote	received for the project		
Balanced draft conversion	\$17,122,000	Adjusted from a B&V balanced draft conversion project based on differences in scope				
Site preparation	\$1,000,000	Contingency for site unknowns, such as underground utilities				
Buildings Total direct costs (DC) = (PEC) + (DIC)	\$200,000 \$79,622,000	Contingency for general site building requirements				
(2.5)	7.0,022,000					
Indirect Costs Engineering Owner's cost Construction management Construction indirect Start-up and spare parts Performance test Contingencies Total indirect costs (IC)	\$5,574,000 \$3,981,000 \$7,962,000 \$16,723,000 \$2,389,000 \$796,000 \$15,924,000 \$53,349,000	(DC) X 5 (DC) X 1 B&V labor marks (DC) X 3 (DC) X 1	7.0% 5.0% 10.0% et review 3.0% 1.0% 20.0%			
Interest During Construction (IDC) Loss Generation during Outage (GEN)	\$4,927,000 \$23,674,000				ct time length X 1/2) 12 weeks required for BDC, 7 weeks major outage available	
Total Capital Investment (TCI) = (DC) + (IC) + (GEN)	\$161,572,000					
ANNUAL COST Direct Annual Costs Fixed annual costs	ψ101,072,000					
Operating labor	\$125,000		TE and	124,862 \$/year	Estimated manpower level	
Maintenance labor & materials	\$2,389,000	(DC) X 3	3.0%			
Total fixed annual costs	\$2,514,000					
Variable annual costs						
Urea	\$2,641,000	1,689 lb	b/hr and	420 \$/ton	Engineering estimate	
Water	\$2,658,000		pm and	15.67 \$/1,000 gal	Engineering estimate	
Catalyst replacement	\$270,000		n3 and	6,500 \$/m3	2 yr catalyst replacement rate	
Auxiliary power	\$32,000		W and	0.06095 \$/kWh	Engineering estimate	
ID fan power  Total variable annual costs	\$997,000 \$6,598,000	2,197 k	,vv and	0.06095 \$/kWh	Engineering estimate	
Total Vallable allitual costs	Ψ0,000,000					
Total direct annual costs (DAC)	\$9,112,000					
Indirect Annual Costs						
Cost for capital recovery	\$15,737,000	(TCI) X 9	9.74%	CRF at 7.41% interest &	20 year life	
Total indirect annual costs (IDAC)	\$15,737,000					
Total Annual Cost (TAC) = (DAC) + (IDAC)	\$24,849,000					